

COMPANY

Larsen & Toubro

LOCATION

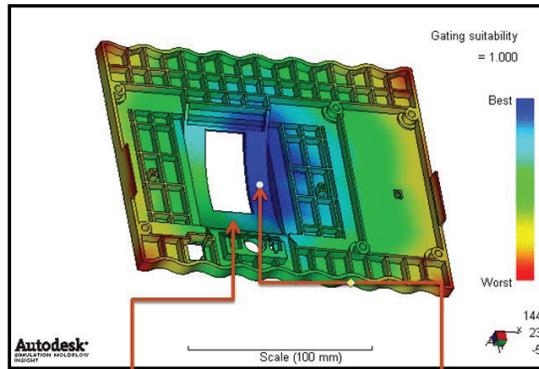
Mumbai, India

SOFTWARE

Autodesk® Moldflow®

Larsen & Toubro (L&T)

BEST GATE LOCATION



EXISTING GATE LOCATION IS MODERATE AS PER GATING SUITABILITY

PROPOSED GATE LOCATION

Image courtesy of Larsen & Toubro.

The predictions showing warpage and short fill were not acceptable and would require a lot of effort and time to fix after the first prototype, there are many factors that influence warpage, such as temperature, wall thickness, residual stress, cooling time and material etc. With Autodesk Moldflow we can predict above molding issues for better product quality.

– Moldflow Team

Case Study

Larsen & Toubro (L&T) was established in Bombay (Mumbai) in 1938 by two Danish engineers, Henning Holck-Larsen and Soren Kristian Toubro. Today, L&T is one of the largest and most respected companies in India. They are leaders in engineering, construction, manufacturing and information technology sectors. Forbes - the reputed US-based global business magazine - has ranked L&T the 9th most innovative company in a global study.

Its subsidiary L&T Electrical & Automation is a leader in low and medium voltage switchgear, electrical systems, marine switchgear, electrical and automation systems integration, energy meters & relays. The company offers top of the line solutions to multiple industry segments, infrastructure and agriculture segments. Their manufacturing operations of E&A's business are located in Mumbai (Powai), Navi Mumbai (Mahape & Rabale), Ahmednagar, Vadodara, Coimbatore and Mysore in India as well as in Saudi Arabia, UAE (Jebel Ali, Dubai), Malaysia, Indonesia Australia and United Kingdom.

Challenges

A constant challenge for L&T (E&A) is to maintain its leadership position through innovation and new product development. To help meet this challenge, they invest in research and development to evolve and grow, while at the same time continuously capturing experiences and best practices.

While working on the development of a product, the L&T Tooling Solutions' team faced a challenging situation of short fill of material and warpage in the component. There was an outward deflection of 2.43mm that was easily visible and would have resulted in low dimensional accuracy and failure in assembling the parts. The short fill of the component was another issue. Melt was not efficiently transferred to the right side of the product, with a fill time of 5.40 Seconds only 90% of the components fill was achieved.

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Key Benefits

The manual process that L&T previously used worked only for parts with simpler geometry. For complex parts a more sophisticated methodology was required.

In the early 2005, L&T management began to evaluate the feasibility of adopting Mold analysis software to handle the diverse issues raised by company's R&D and production teams. "We use a wide range of materials for a variety of products; we needed a comprehensive set of functionality that would help us to avoid potential manufacturing problems and address recurring challenges. We selected Autodesk Moldflow because it offers a better technology and more advance and accurate simulation technologies for the

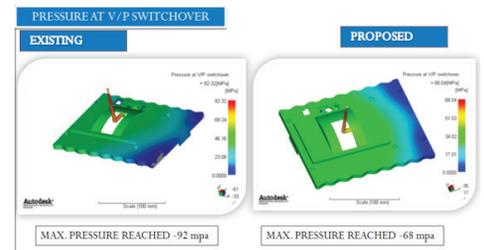


Image courtesy of Larsen & Toubro.

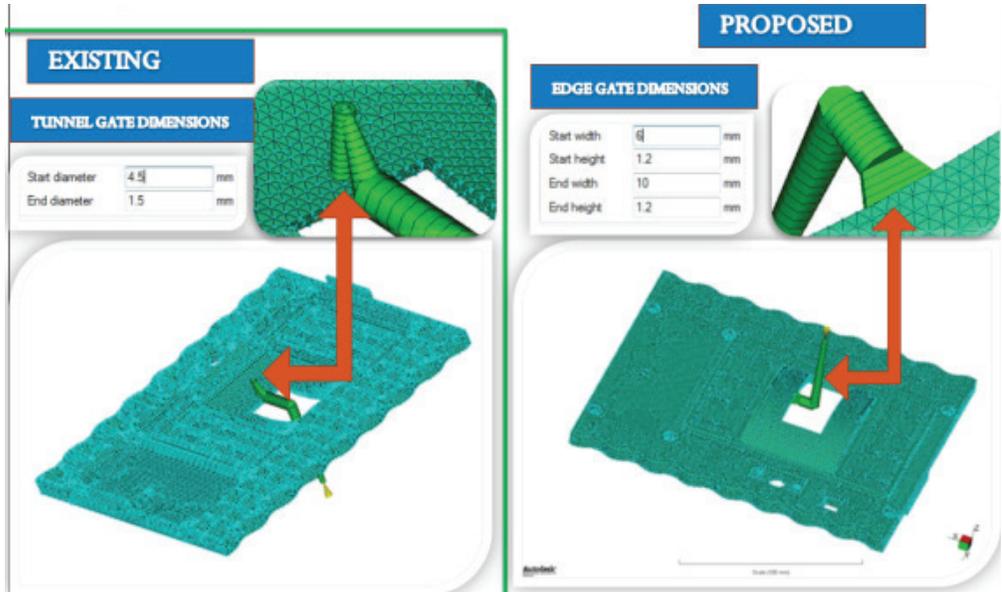


Image courtesy of Larsen & Toubro.

validation and optimization of plastic parts” explained Mr. Suryakant K Pawar DGM L&T Engineered Tooling Solutions.

The Solution

Within a short time, L&T completed a number of component verifications with their technical competency and experience with Autodesk Moldflow – to overcome Warpage and short fill issues was the top priority since product quality is affected. Getting stability with the trial was of moderate level, Autodesk Moldflow proposed a new gate location with better gating stability. The tunnel gate was changed to edge gate with larger head dimensions for uniform filling of the component.

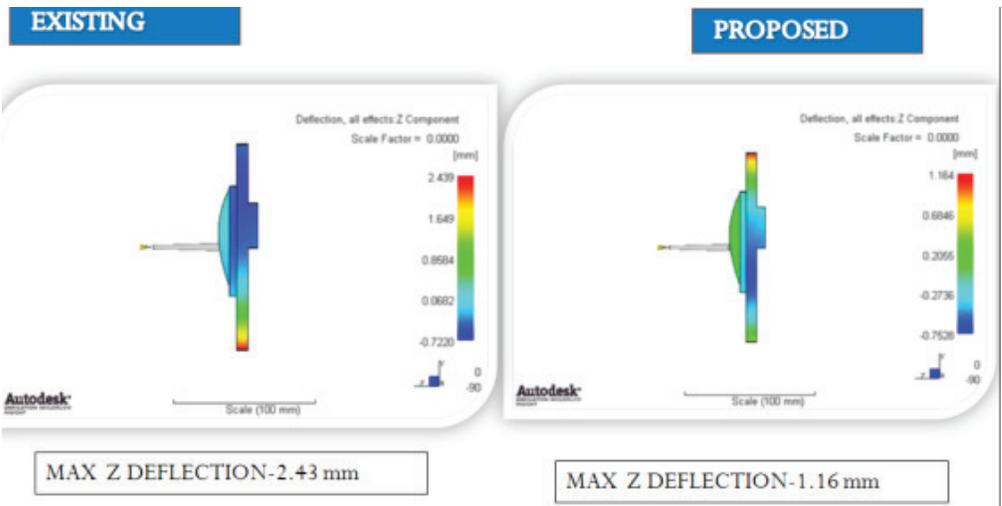


Image courtesy of Larsen & Toubro.

After, few analyses using various materials available, the material was changed to Durethan DP BKV 60 H2.0EF with 60% glass fillers for its better flow strength and properties.

Results

Through Autodesk Moldflow, the L&T engineers significantly reduce warpage to meet the requirement for dimensional stability. As a result, the Z-displacement has been reduced by almost 50%; Max Z deflection was reduced to 1.16mm from 2.43mm. Change in the gate location and feed type also reduces the pressure from 92 mpa to 68 mpa with the uniform filling of the material in the component. With these design modifications recommended by Autodesk Moldflow, they achieved ideal and balanced filling pattern and decreased the overall fill pressure required.

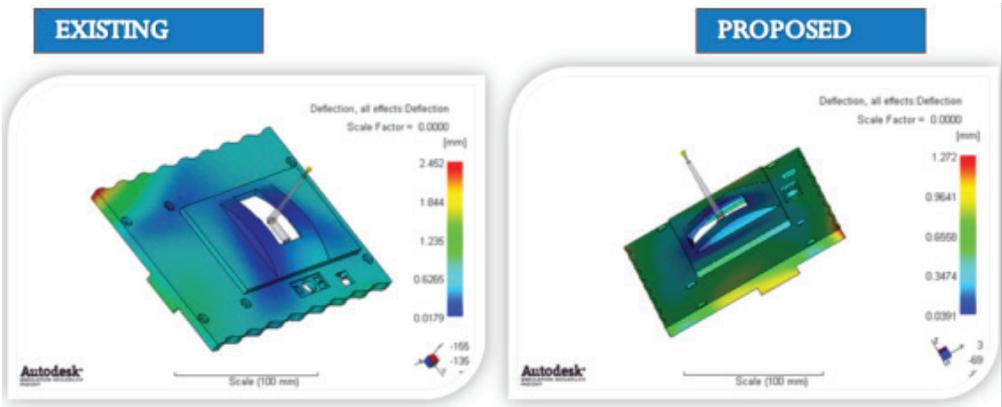


Image courtesy of Larsen & Toubro.

“Performing analysis on Autodesk Moldflow is invaluable to the success of our business; we can predict flow, shrinkage, warpage and other behaviors during the early design phase and ensure that potential manufacturing problems are detected much before they become real problems. Autodesk Moldflow is not just an analysis tool but also effective tools to increase you’re expertise with accurate results” concludes Mr. Shailesh Agrawal Sr. Engineer Design & Engineering, L&T Engineered Tooling Solutions.